CLAIMS

1. An integrated optical device comprising:

a first and a second integrated waveguides (**201**,**203**) each comprising a core and a cladding, a section (**201a**) of the first waveguide and a section of the second waveguide (**203a**) being arranged so as to be in optical coupling relationship (**205**), and

a first and a second modulated refractive index structures (**215**,**217**), respectively formed along the first waveguide section and the second waveguide section, each modulated refractive index structure comprising at least one pair of regions (**403**,**401**) having a first refractive index n_1 and, respectively, a second refractive index n_2 greater than the first, said regions being adjacent to each other along the respective waveguide section,

characterised in that

said regions comprise a portion (**403**) of the respective waveguide section and a gap (**401**) extending at least across the entire cross-section of the core of the respective waveguide section, the percentage difference $\Delta n = 100 \times (n_2/n_1 - 1)$ [%] between said first and second refractive indexes being greater than 1.5 %.

2. The integrated optical device according to claim 1,

wherein said percentage difference is greater than 10 %.

3. The integrated optical device according to claim 2, wherein said percentage difference is greater than 50 %.

4. The integrated optical device according to claim 1, in which the first and second modulated refractive index structures comprise each a plurality of pairs (**C;C1-C15**) of regions of mutually different refractive index, arranged in succession along the respective waveguide section.

5. The integrated optical device according to claim 4, in which at least one of said plurality of pairs of regions is a transmissive pair (**C1,C4,C8,C12,C15**) for transmitting optical signals with wavelengths within a prescribed wavelength pass band (**PB1,PB2**), the remaining pairs of regions (**C2,C3,C5-C7,C9-C11,C13,C14**) being reflective pairs for reflecting optical signals with wavelengths within a prescribed wavelength stop band (**SB**) containing the pass band.

6. The integrated optical device according to claim 5, in which said pass band corresponds to at least one prescribed channel (**S(λ1), S(λ2),…**) of a wavelength division multiplexed signal (**S_{IN}{S(λ1), S(λ2),…}**), and said stop band

is at least as wide as an overall wavelength spectrum region occupied by the wavelength division multiplexed signal.

7. The integrated optical device according to claim 5 or 6, in which said plurality of pairs of regions comprises two or more transmissive pairs, distributed among the reflective pairs, for transmitting optical signals with wavelengths within a prescribed wavelength pass band (**PB1**,**PB2**), the remaining pairs of regions (**C2**,**C3**,**C5**-**C7**,**C9**-**C11**,**C13**,**C14**) being reflective pairs for reflecting optical signals with wavelengths within a prescribed wavelength stop band (**SB**) containing the pass band.

8. The integrated optical device according to claim 7, in which the transmissive pairs have varying optical lengths (**d1**+**d2**) in the light propagation direction.

9. The integrated optical device according to claim 8, in which a number of reflective pairs between adjacent transmissive pairs varies along the respective waveguide section.

10. The integrated optical device according to any one of claims 1 to 9, in which the optically coupled waveguide sections of the first and second waveguides have a length

such that an optical signal propagating through a first one of the two waveguides is substantially completely transferred to the second waveguide.

11. The integrated optical device according to claim 10, in which each one of the first and second modulated refractive index structures is positioned along the respective waveguide sections in such a way that an equivalent mirror thereof is located substantially at a position where a factor of optical coupling between the optically coupled waveguide sections is approximately equal to 50%.

12. The integrated optical device according to any one of claims 6 to 11, in which the first waveguide has a first input section (**207**), adjacent a first side of the optically coupled waveguide sections, and the second waveguide has a first and a second output sections (**211**,**213**), respectively adjacent a second side and the first side of the optically coupled waveguide sections, and the device comprises:

a first optical path from the first input section to the first output section, the first optical path propagating from the first input section to the first output section a first optical signal (**S(λ1)**) with wavelength in said pass band;

a second optical path from the first input section to the second output section, the second optical path propagating from the first input section to the second output section a second optical signal (**S_{OUT}{ S(λ2),...}**) with wavelength in said stop band but outside the pass band.

13. The integrated optical device according to claim 12, in which the first waveguide further comprises a second input section (**209**), adjacent the second side of the optically coupled waveguide sections, and the device comprises a third optical path from the second input section to the second output section, the third optical path propagating from the second input section to the second output section a third second optical signal (**S'(λ1)**) with wavelength in said pass band.

14. The integrated optical device according to claim 1, in which an interface between said regions of mutually different refractive index is arranged orthogonally to the light propagation direction in the respective uncoupled waveguide section.

15. An integrated optical multiplexer/demultiplexer device comprising at least a first and a second integrated optical devices (**1011-1014;1201-1206;133,135**) according to

claim 13, in which one among the first and second output sections of the first integrated optical device is connected to one among the first and second input section of the second integrated optical device.

16. The integrated optical multiplexer/demultiplexer device according to claim 15, in which the second output section of the first integrated optical device is connected to the first input section of the second integrated optical device, the first and second integrated optical devices having differentiated first and second pass bands, corresponding to respective first and second channels of a wavelength division multiplexed optical.

17. The integrated optical multiplexer/demultiplexer device according to claim 15, comprising a first integrated optical device (**1201**) adapted to separating an input wavelength division multiplexed optical signal into two groups of channels adjacent to each other in the wavelength domain, at least one second integrated optical device (**1202-1205**) adapted to extracting a signal in a respective channel of a respective one of the two channel groups and adding a new signal in the same channel as the extracted signal, and a third integrated optical device (**1206**) for recombining the two channel groups.

18. The integrated optical multiplexer/demultiplexer device according to claim 15, in which the first output section of the first integrated optical device is connected to the first input section of the second integrated optical device, and the second input section of the first integrated optical device is connected to the second output section of the second integrated optical device, and comprising a tuning device (**137**) for varying a pass band of the second integrated optical device in a wavelength range containing a pass band of the first integrated optical device.

19. A process for manufacturing an integrated optical device, comprising:

forming on a substrate (**301**) a first and a second integrated waveguides (**201,203**) each comprising a core and a cladding, a section (**201a**) of the first waveguide and a section of the second waveguide (**203a**) being arranged so as to be in optical coupling relationship (**205**);

forming along the first waveguide section and the second waveguide section at least one respective first and second modulated refractive index regions (**215,217**), comprising each at least one pair of regions having a first refractive index n_1 and, respectively, a second refractive index n_2 greater than the first, said regions being adjacent

to each other along the respective waveguide section,

characterised in that

said forming the at least one pair of region comprises cutting away a portion of the respective waveguide section for defining a gap (**401**) between two adjacent portions (**403**) of the respective waveguide section, said gap extending for at least the entire cross-section of the core of the respective waveguide section, and

making the percentage difference $\Delta n = 100 \times (n_2/n_1 - 1)$ [%] between said first and second refractive indexes greater than 1.5 %.

20. The process according to claim 19, in which said cutting away is performed simultaneously in the first and second waveguide sections.

21. The process according to claim 19 or 20, in which said cutting away comprises using a mask defining a pattern of cuts to be formed in the first and second waveguide sections, and selectively removing the first and second waveguide sections according to the pattern defined by the mask.

22. The process according to claim 19, further comprising filling said gaps with a substance having a

refractive index different from that of the waveguide sections.

23. The process according to claim 22, in which said substance is air.